



The **angle  $\alpha$**  is  $30^\circ$  in the example ( $\pi/6$  in radians). The **sine of  $\alpha$** , which is the height of the red line, is

$$\sin \alpha = \frac{1}{2}.$$

By the Theorem of Pythagoras we have  $\cos^2 \alpha + \sin^2 \alpha = 1$ . Thus the length of the blue line, which is the **cosine of  $\alpha$** , must be

$$\cos \alpha = \sqrt{1 - \frac{1}{4}} = \frac{1}{2}\sqrt{3}.$$

This shows that **tan  $\alpha$** , which is the height of the orange line, is

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{1}{\sqrt{3}}.$$